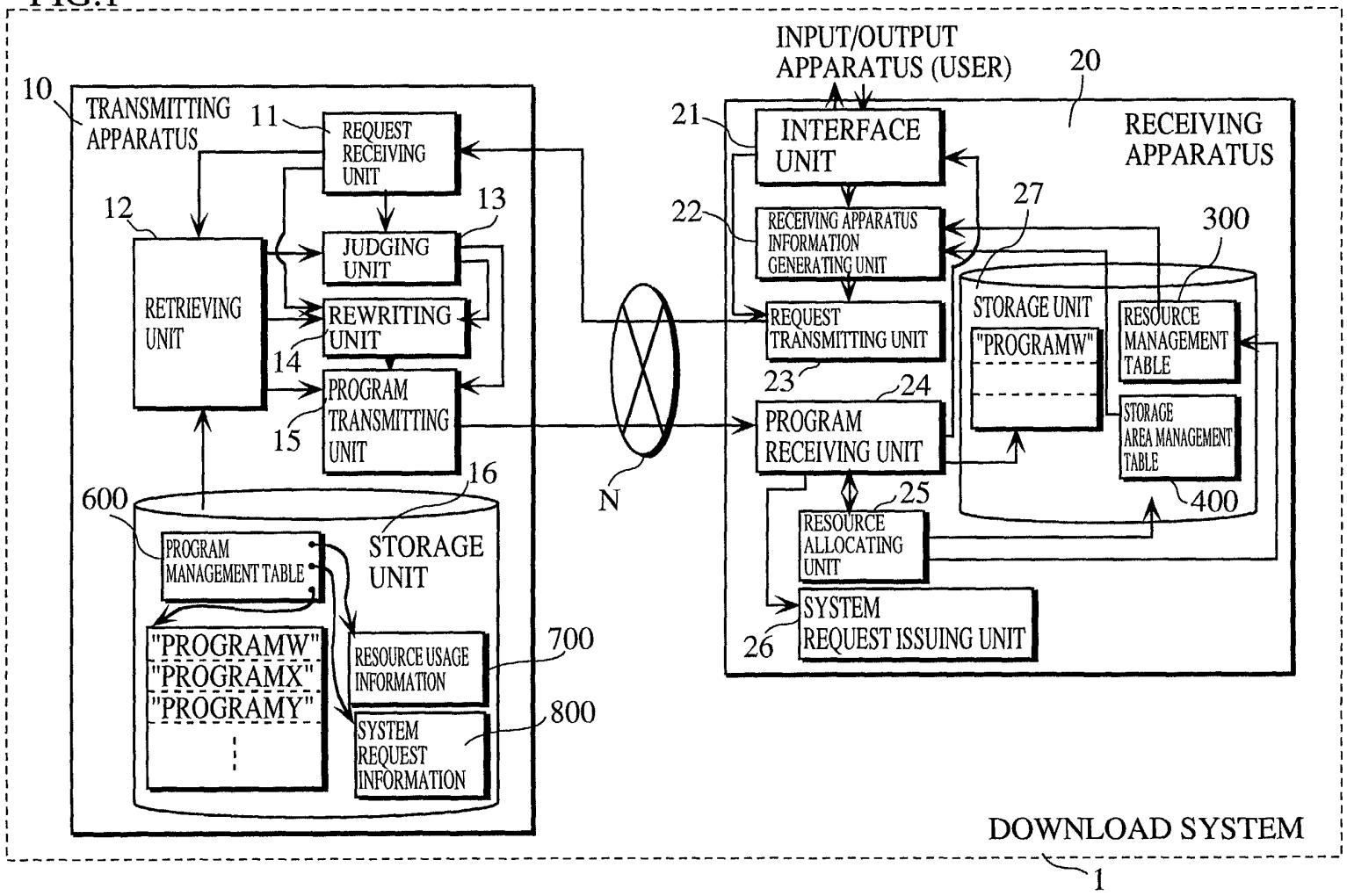
EP 1 080 560 B1

FIG.1



EP 0 780 9220 2660

FIG. 2

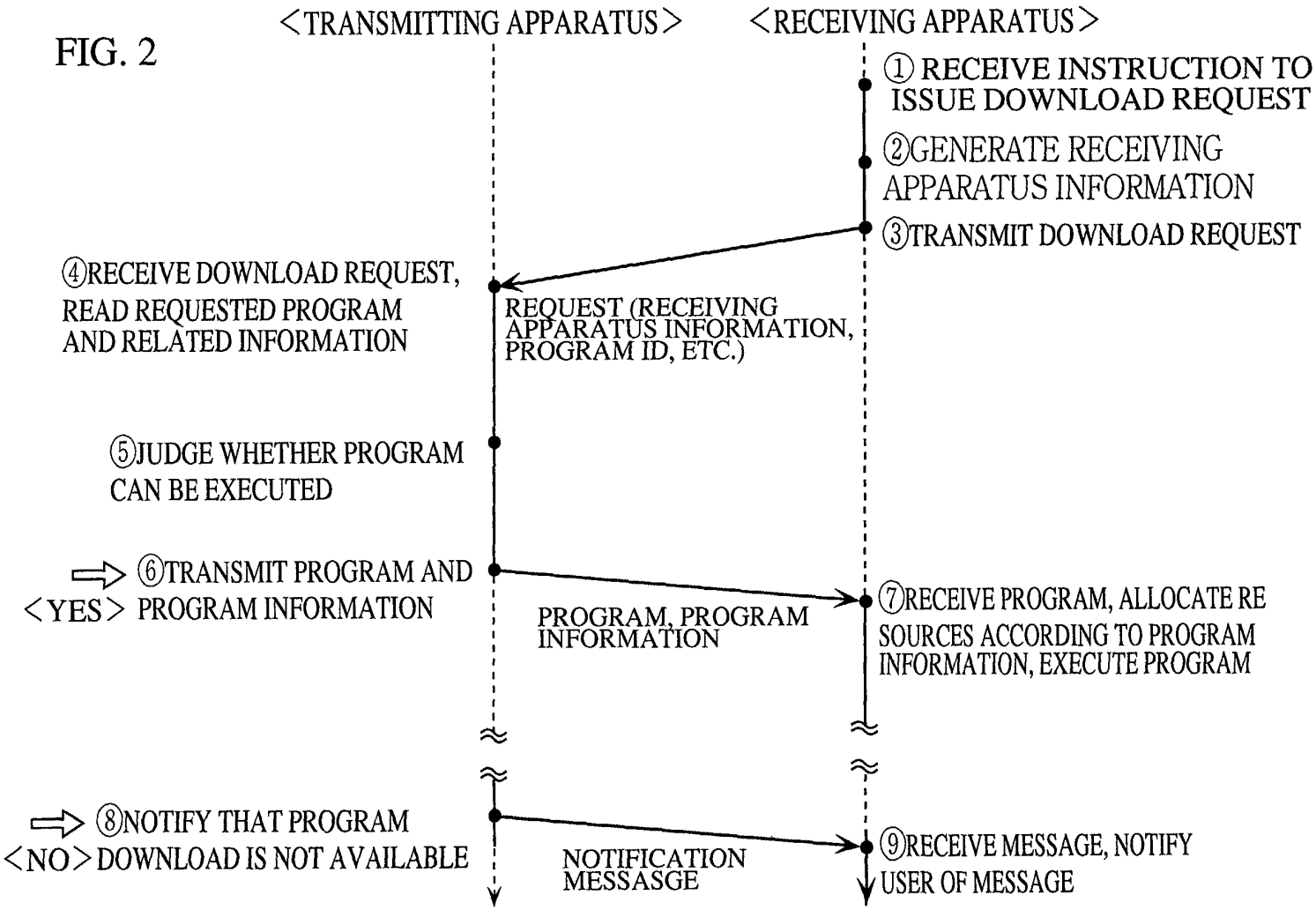
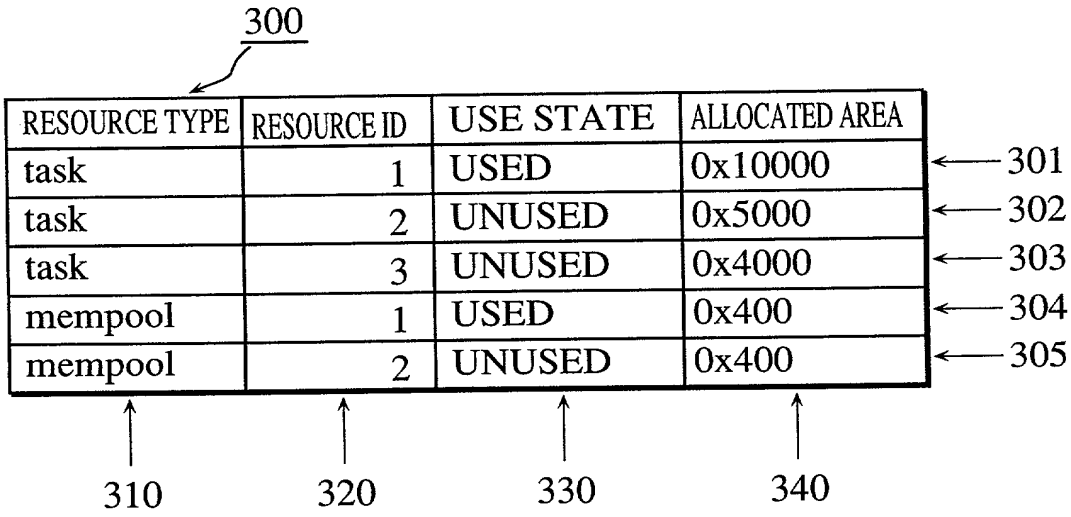
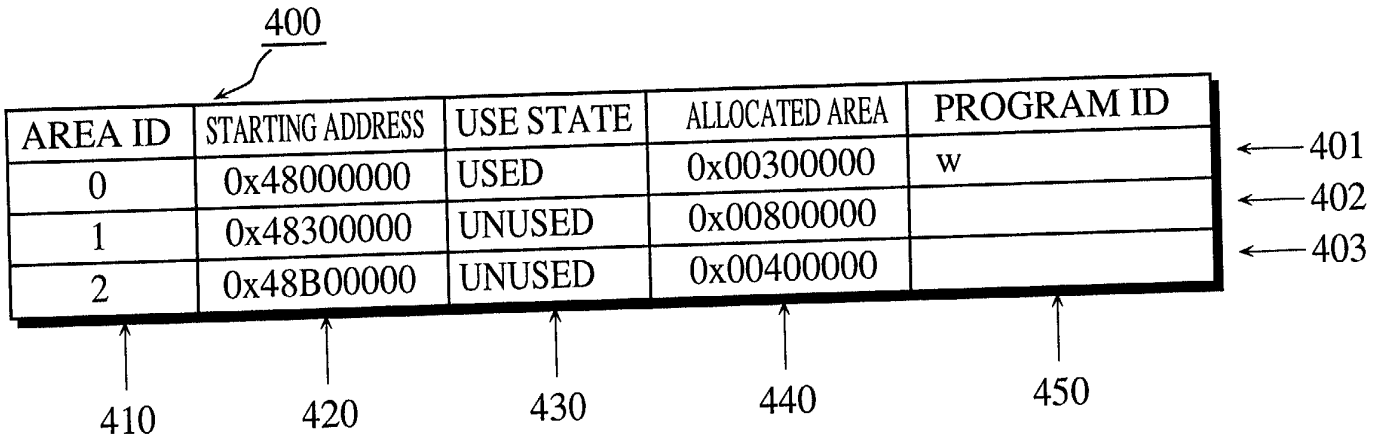


FIG. 3


300
RESOURCE TYPE
RESOURCE ID
USE STATE
ALLOCATED AREA
task 1 USED 0x10000
task 2 UNUSED 0x5000
task 3 UNUSED 0x4000
mempool 1 USED 0x400
mempool 2 UNUSED 0x400
301
302
303
304
305
310
320
330
340

KR0180*9220260

FIG. 4



KOREAN PATENT 9220260

FIG.5

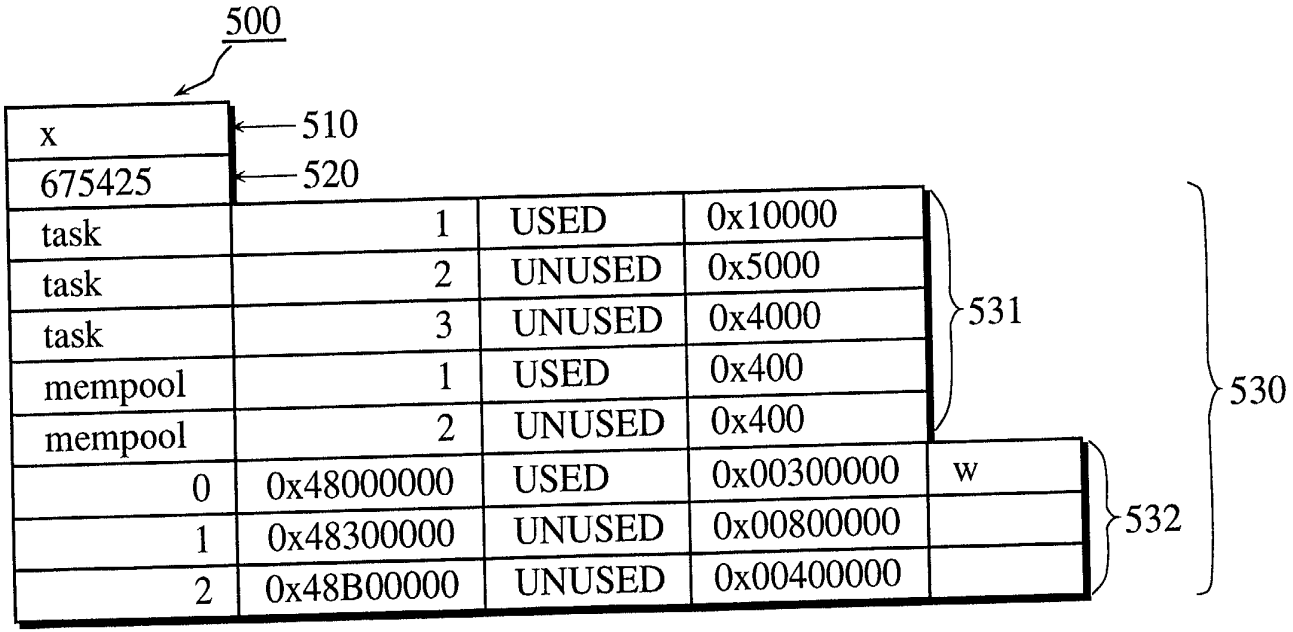


FIG. 6

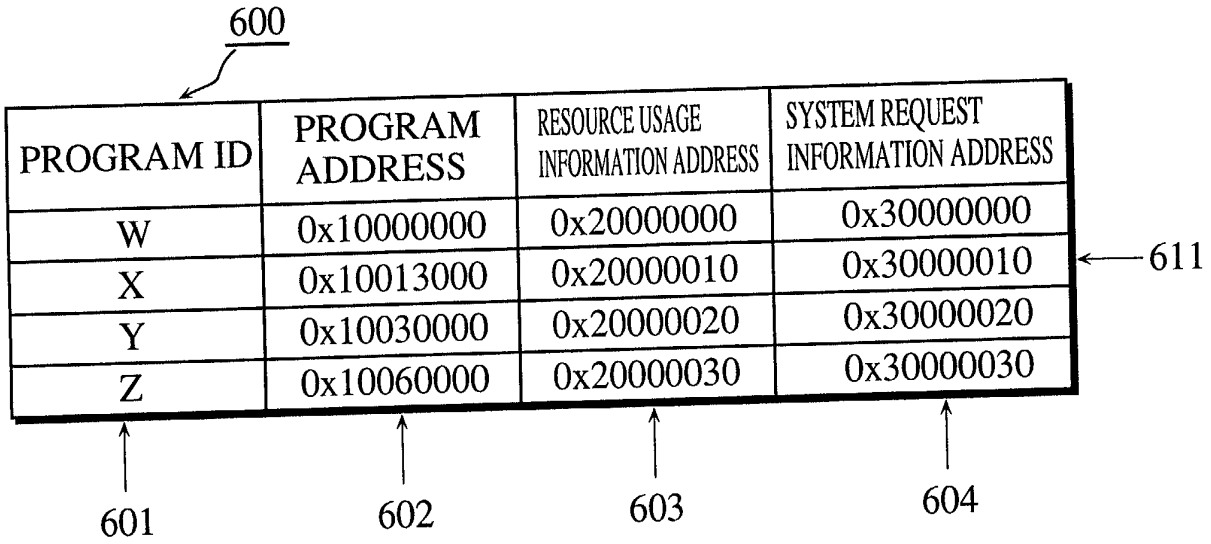

600
PROGRAM ID
PROGRAM ADDRESS
RESOURCE USAGE INFORMATION ADDRESS
SYSTEM REQUEST INFORMATION ADDRESS
W
0x10000000
0x20000000
0x30000000
X
0x10013000
0x20000010
0x30000010
Y
0x10030000
0x20000020
0x30000020
Z
0x10060000
0x20000030
0x30000030
611
601
602
603
604

FIG. 7

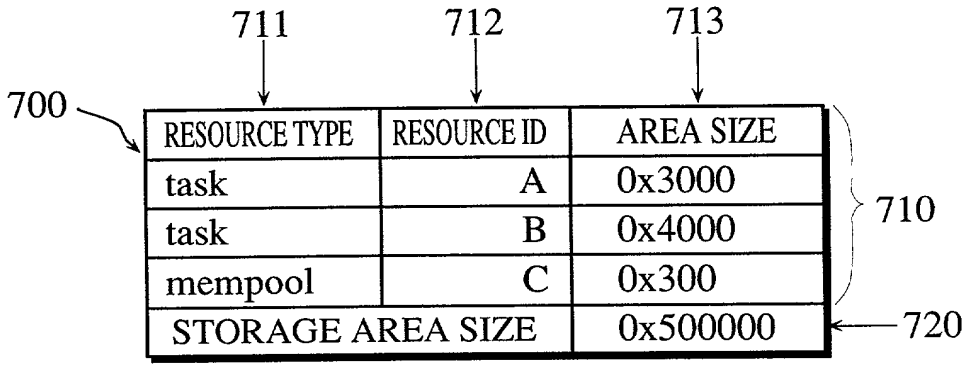

711
712
713
700
RESOURCE TYPE
RESOURCE ID
AREA SIZE
task
A
0x3000
task
B
0x4000
mempool
C
0x300
STORAGE AREA SIZE
0x500000
710
720

FIG. 8

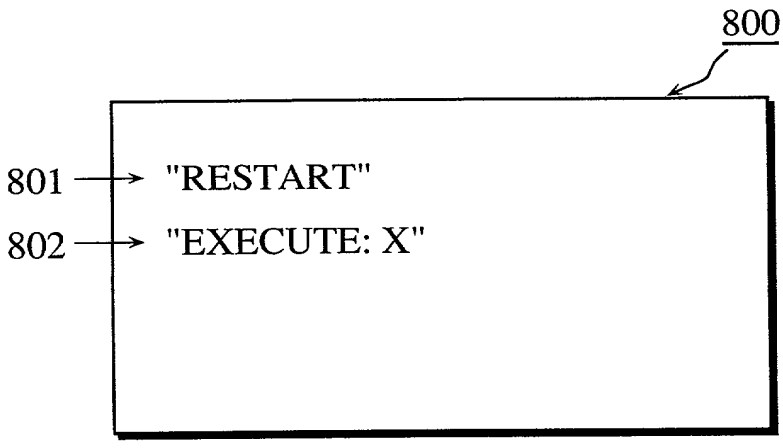

800
801
"RESTART"
802
"EXECUTE: X"

FIG. 9

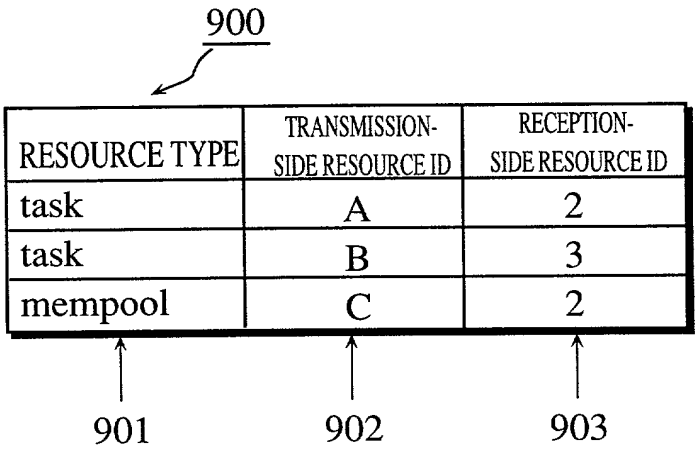

900
RESOURCE TYPE
TRANSMISSION-SIDE RESOURCE ID
RECEPTION-SIDE RESOURCE ID
task
A
2
task
B
3
mempool
C
2
901
902
903

FIG. 10

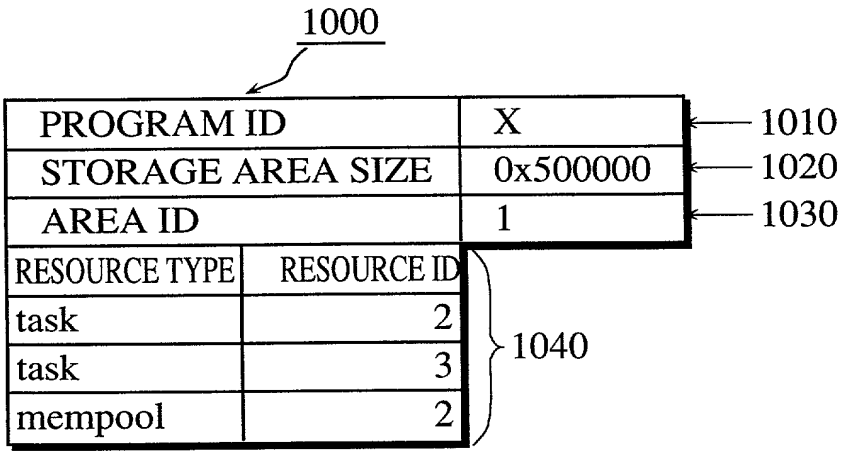

1000
PROGRAM ID
X
1010
STORAGE AREA SIZE
0x500000
1020
AREA ID
1
1030
RESOURCE TYPE
RESOURCE ID
task
2
task
3
mempool
2
1040

FIG.11A

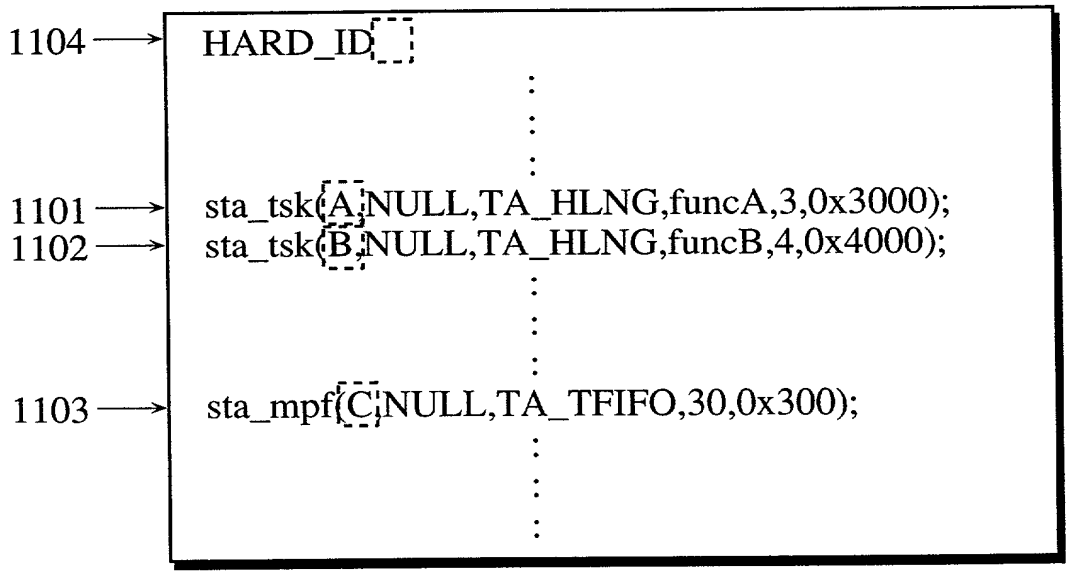


FIG.11B

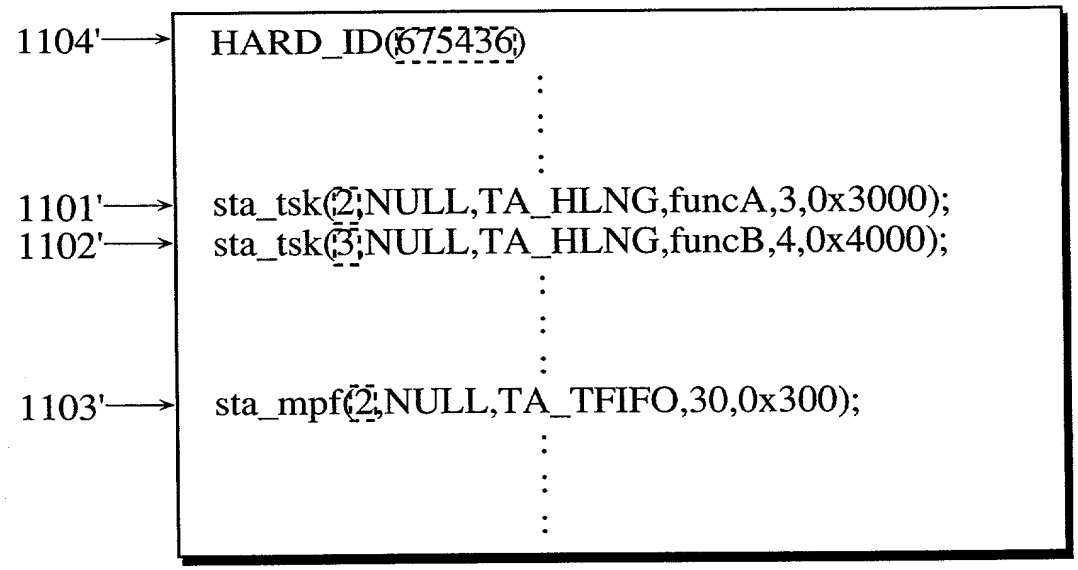


FIG. 12

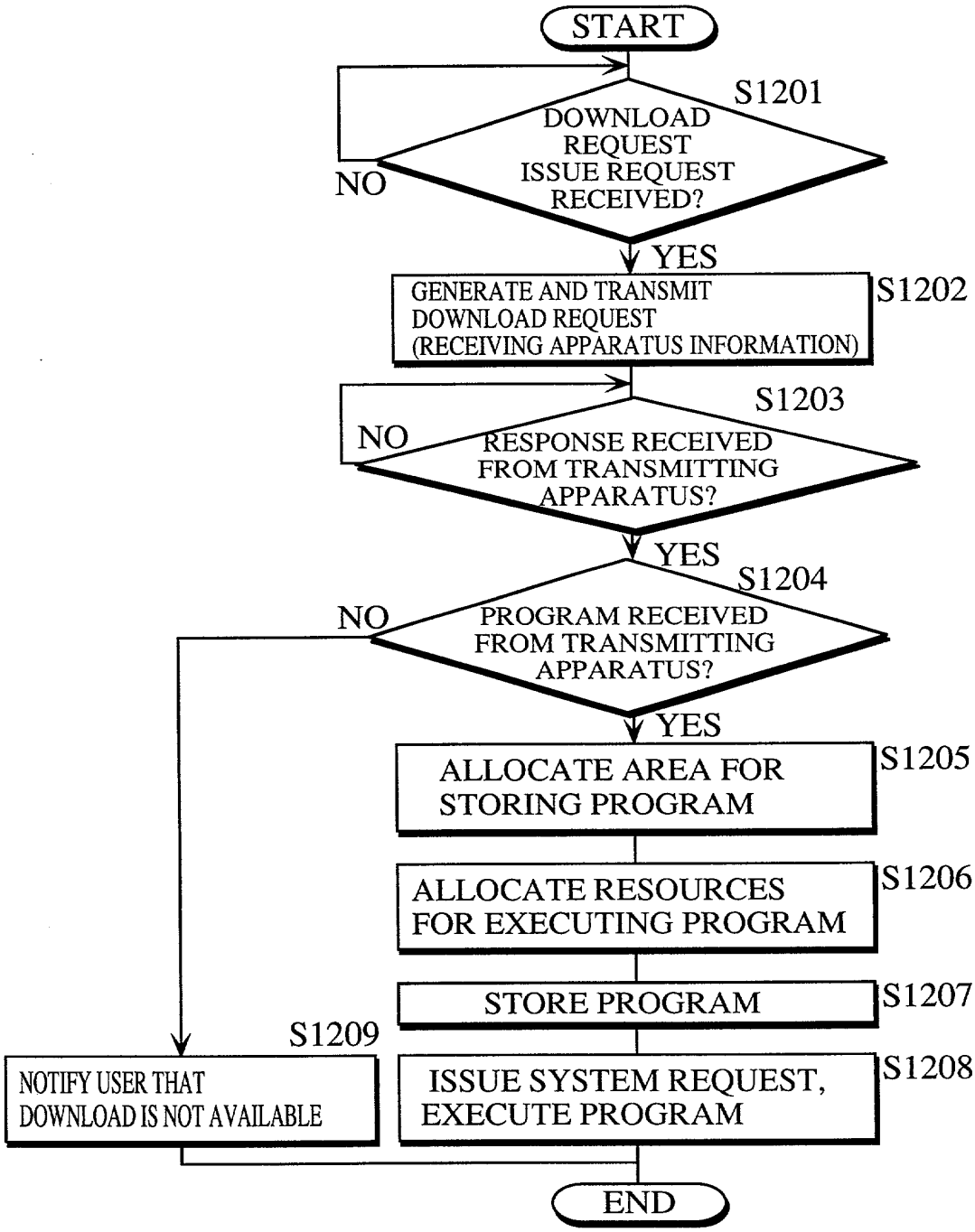

START
S1201
DOWNLOAD REQUEST ISSUE REQUEST RECEIVED?
NO
YES
GENERATE AND TRANSMIT DOWNLOAD REQUEST (RECEIVING APPARATUS INFORMATION)
S1202
S1203
NO
RESPONSE RECEIVED FROM TRANSMITTING APPARATUS?
YES
S1204
NO
PROGRAM RECEIVED FROM TRANSMITTING APPARATUS?
YES
ALLOCATE AREA FOR STORING PROGRAM
S1205
ALLOCATE RESOURCES FOR EXECUTING PROGRAM
S1206
STORE PROGRAM
S1207
S1209
NOTIFY USER THAT DOWNLOAD IS NOT AVAILABLE
ISSUE SYSTEM REQUEST, EXECUTE PROGRAM
S1208
END

FIG. 13

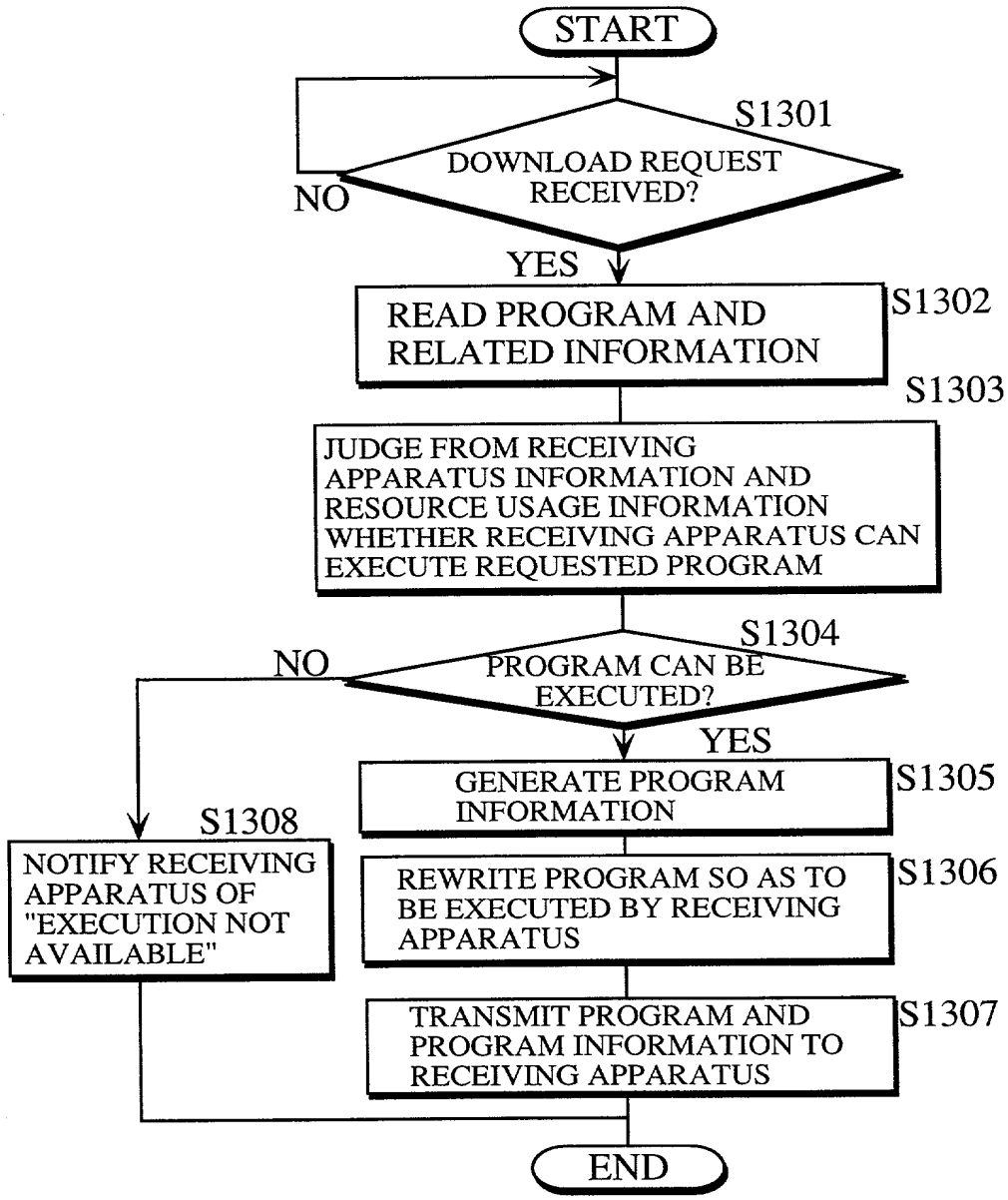

START
S1301
DOWNLOAD REQUEST RECEIVED?
NO
YES
READ PROGRAM AND RELATED INFORMATION
S1302
S1303
JUDGE FROM RECEIVING APPARATUS INFORMATION AND RESOURCE USAGE INFORMATION WHETHER RECEIVING APPARATUS CAN EXECUTE REQUESTED PROGRAM
S1304
NO
PROGRAM CAN BE EXECUTED?
YES
GENERATE PROGRAM INFORMATION
S1305
S1308
NOTIFY RECEIVING APPARATUS OF "EXECUTION NOT AVAILABLE"
REWRITE PROGRAM SO AS TO BE EXECUTED BY RECEIVING APPARATUS
S1306
TRANSMIT PROGRAM AND PROGRAM INFORMATION TO RECEIVING APPARATUS
S1307
END

FIG.14A

400

AREA ID	STARTING ADDRESS	USE STATE	ALLOCATED AREA	PROGRAM ID
0	0x48000000	USED	0x00300000	w
1	0x48300000	UNUSED	0x00800000	
2	0x48B00000	UNUSED	0x00400000	

← 1401

FIG.14B

400

AREA ID	STARTING ADDRESS	USE STATE	ALLOCATED AREA	PROGRAM ID
0	0x48000000	USED	0x00300000	w
1	0x48300000	USED	0x00500000	x
2	0x48800000	UNUSED	0x00300000	
3	0x48B00000	UNUSED	0x00400000	

← 1401
← 1402

FIG.15A

300

RESOURCE TYPE	RESOURCE ID	USE STATE	ALLOCATED AREA
task	1	USED	0x10000
task	2	UNUSED	0x5000
task	3	UNUSED	0x4000
mempool	1	USED	0x400
mempool	2	UNUSED	0x400

FIG.15B

300

RESOURCE TYPE	RESOURCE ID	USE STATE	ALLOCATED AREA
task	1	USED	0x10000
task	2	USED	0x5000
task	3	USED	0x4000
mempool	1	USED	0x400
mempool	2	USED	0x400

FIG. 16

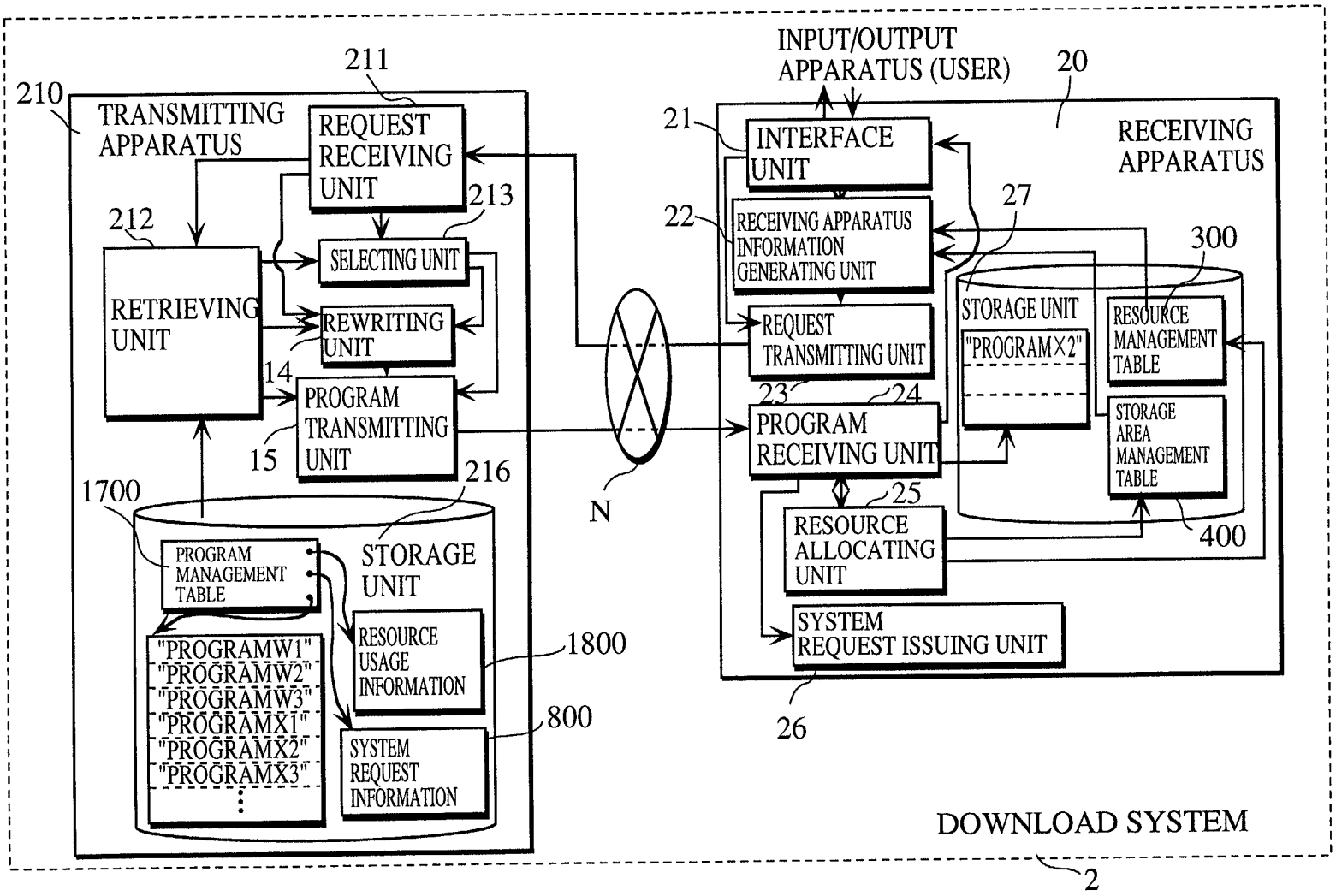

210
TRANSMITTING APPARATUS
211
REQUEST RECEIVING UNIT
213
212
RETRIEVING UNIT
SELECTING UNIT
REWRITING UNIT
14
PROGRAM TRANSMITTING UNIT
15
216
1700
PROGRAM MANAGEMENT TABLE
STORAGE UNIT
"PROGRAMW1"
"PROGRAMW2"
"PROGRAMW3"
"PROGRAMX1"
"PROGRAMX2"
"PROGRAMX3"
RESOURCE USAGE INFORMATION
1800
SYSTEM REQUEST INFORMATION
800
N
INPUT/OUTPUT APPARATUS (USER)
20
RECEIVING APPARATUS
21
INTERFACE UNIT
22
RECEIVING APPARATUS INFORMATION GENERATING UNIT
27
300
REQUEST TRANSMITTING UNIT
STORAGE UNIT
"PROGRAM×2"
RESOURCE MANAGEMENT TABLE
23
24
PROGRAM RECEIVING UNIT
STORAGE AREA MANAGEMENT TABLE
25
400
RESOURCE ALLOCATING UNIT
SYSTEM REQUEST ISSUING UNIT
26
DOWNLOAD SYSTEM
2

FIG. 17

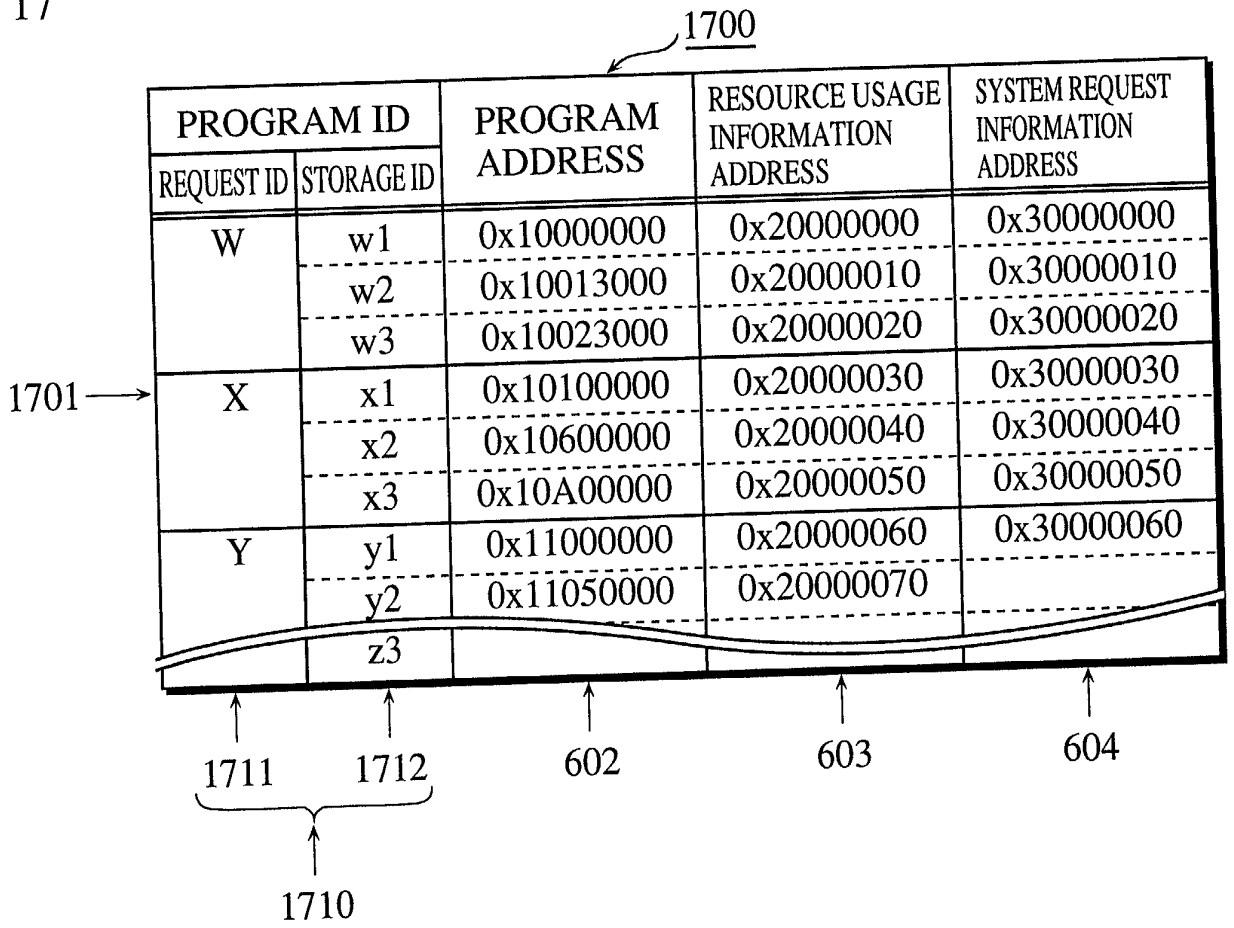
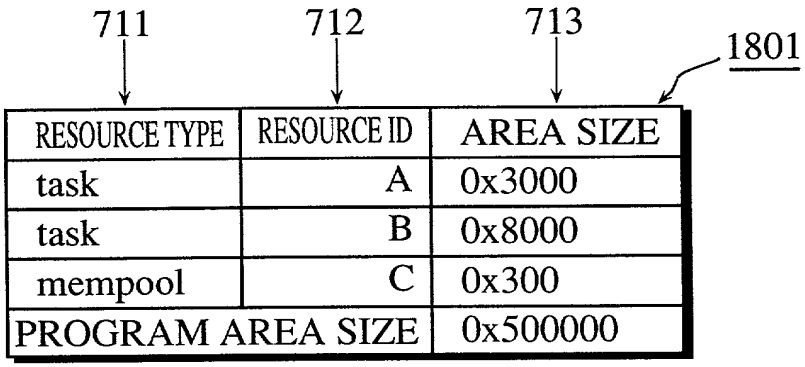
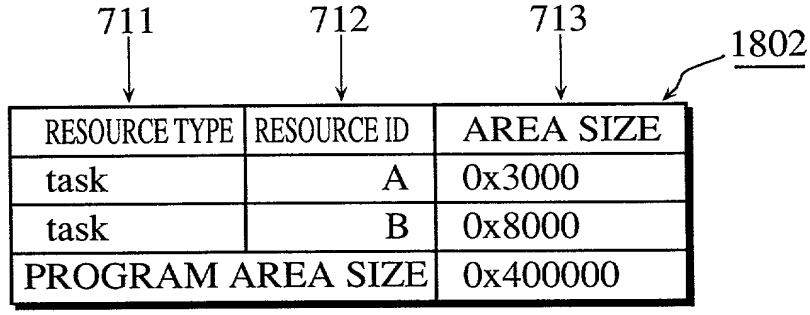

1700
PROGRAM ID
REQUEST ID
STORAGE ID
PROGRAM ADDRESS
RESOURCE USAGE INFORMATION ADDRESS
SYSTEM REQUEST INFORMATION ADDRESS
W
w1
0x10000000
0x20000000
0x30000000
w2
0x10013000
0x20000010
0x30000010
w3
0x10023000
0x20000020
0x30000020
1701
X
x1
0x10100000
0x20000030
0x30000030
x2
0x10600000
0x20000040
0x30000040
x3
0x10A00000
0x20000050
0x30000050
Y
y1
0x11000000
0x20000060
0x30000060
y2
0x11050000
0x20000070
z3
1711
1712
602
603
604
1710

FIG. 18A



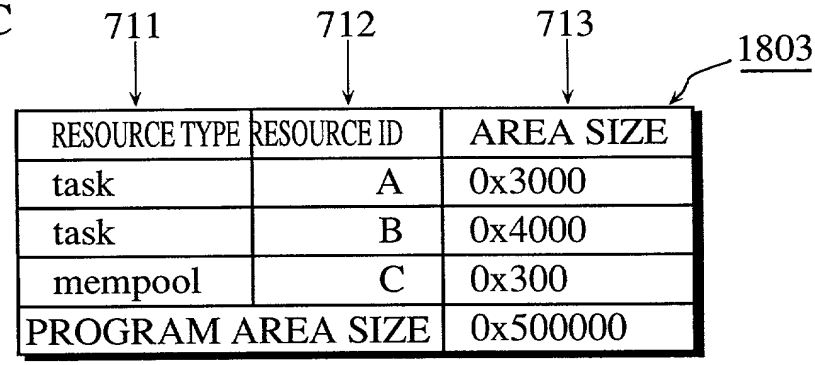
RESOURCE TYPE	RESOURCE ID	AREA SIZE
task	A	0x3000
task	B	0x8000
mempool	C	0x300
PROGRAM AREA SIZE		0x500000

FIG. 18B



RESOURCE TYPE	RESOURCE ID	AREA SIZE
task	A	0x3000
task	B	0x8000
PROGRAM AREA SIZE		0x400000

FIG. 18C



RESOURCE TYPE	RESOURCE ID	AREA SIZE
task	A	0x3000
task	B	0x4000
mempool	C	0x300
PROGRAM AREA SIZE		0x500000

FIG.19

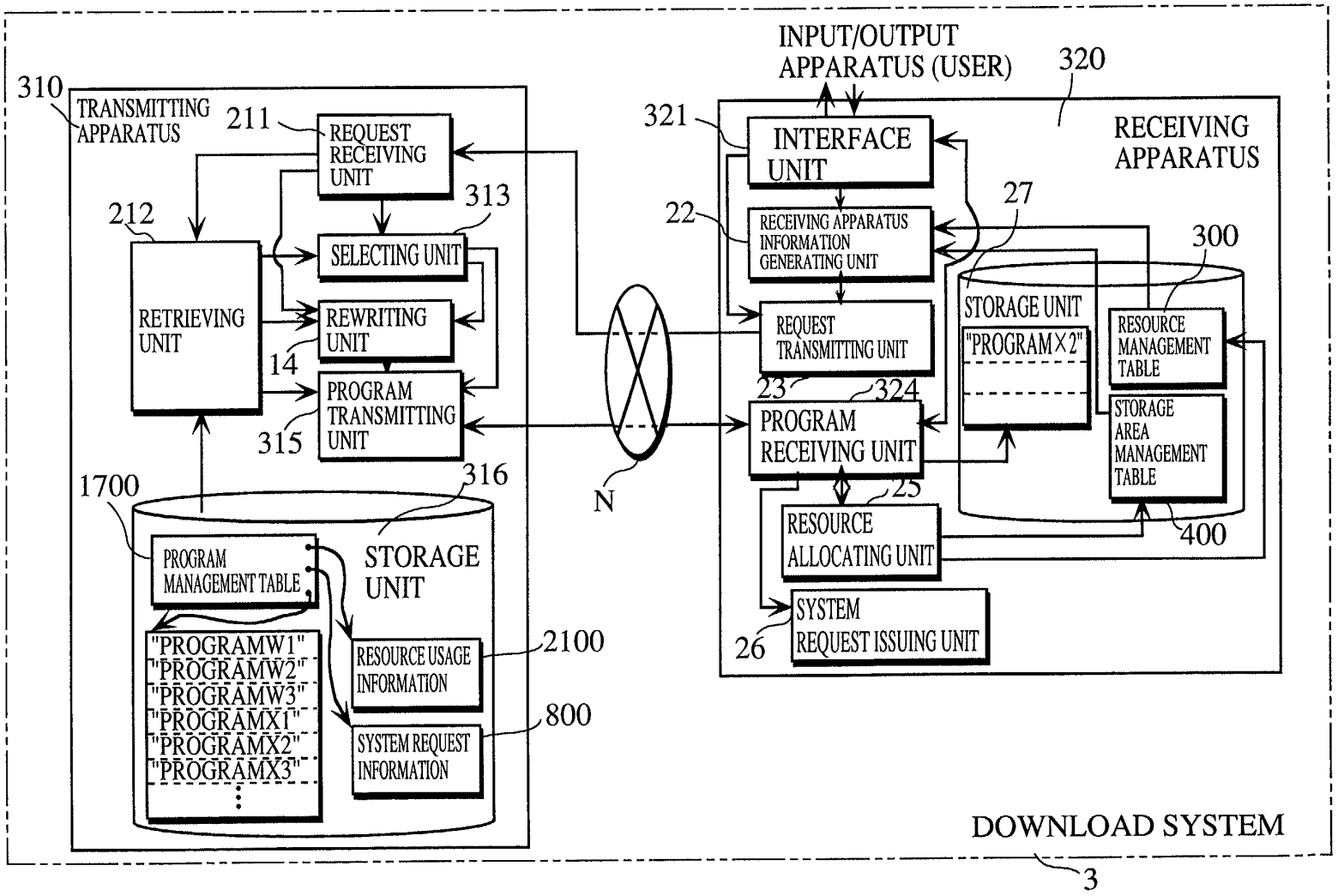

INPUT/OUTPUT APPARATUS (USER)
320
310
TRANSMITTING APPARATUS
211
REQUEST RECEIVING UNIT
313
212
SELECTING UNIT
RETRIEVING UNIT
REWRITING UNIT
14
PROGRAM TRANSMITTING UNIT
315
316
1700
PROGRAM MANAGEMENT TABLE
STORAGE UNIT
"PROGRAMW1"
"PROGRAMW2"
"PROGRAMW3"
"PROGRAMX1"
"PROGRAMX2"
"PROGRAMX3"
RESOURCE USAGE INFORMATION
2100
SYSTEM REQUEST INFORMATION
800
N
321
INTERFACE UNIT
RECEIVING APPARATUS
22
RECEIVING APPARATUS INFORMATION GENERATING UNIT
27
300
REQUEST TRANSMITTING UNIT
STORAGE UNIT
"PROGRAM×2"
RESOURCE MANAGEMENT TABLE
23
324
PROGRAM RECEIVING UNIT
STORAGE AREA MANAGEMENT TABLE
25
RESOURCE ALLOCATING UNIT
400
SYSTEM REQUEST ISSUING UNIT
26
DOWNLOAD SYSTEM
3

FIG.20

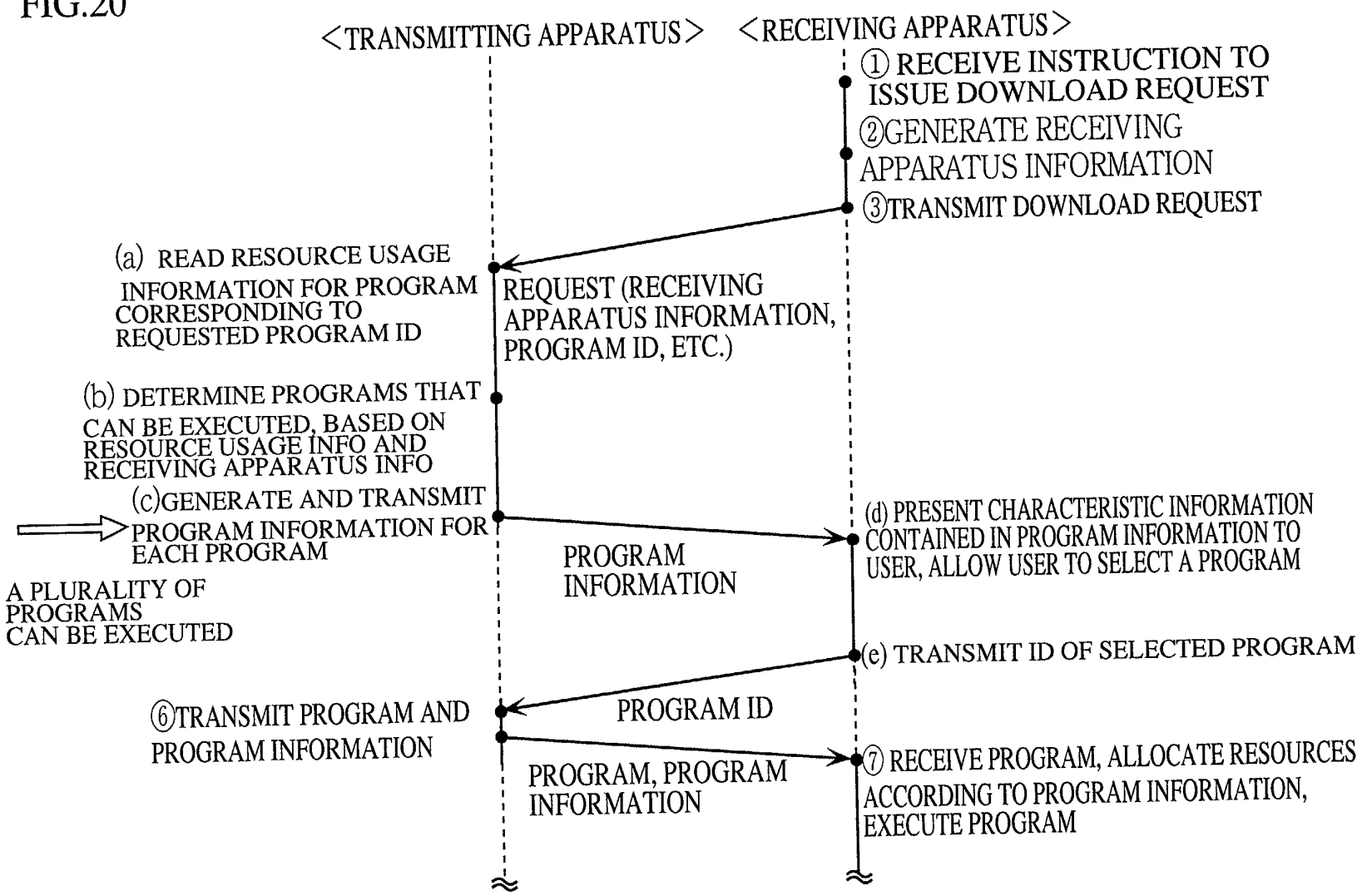

<TRANSMITTING APPARATUS>
<RECEIVING APPARATUS>
① RECEIVE INSTRUCTION TO ISSUE DOWNLOAD REQUEST
②GENERATE RECEIVING APPARATUS INFORMATION
③TRANSMIT DOWNLOAD REQUEST
(a) READ RESOURCE USAGE INFORMATION FOR PROGRAM CORRESPONDING TO REQUESTED PROGRAM ID
REQUEST (RECEIVING APPARATUS INFORMATION, PROGRAM ID, ETC.)
(b) DETERMINE PROGRAMS THAT CAN BE EXECUTED, BASED ON RESOURCE USAGE INFO AND RECEIVING APPARATUS INFO
(c)GENERATE AND TRANSMIT PROGRAM INFORMATION FOR EACH PROGRAM
A PLURALITY OF PROGRAMS CAN BE EXECUTED
PROGRAM INFORMATION
(d) PRESENT CHARACTERISTIC INFORMATION CONTAINED IN PROGRAM INFORMATION TO USER, ALLOW USER TO SELECT A PROGRAM
(e) TRANSMIT ID OF SELECTED PROGRAM
PROGRAM ID
⑥TRANSMIT PROGRAM AND PROGRAM INFORMATION
PROGRAM, PROGRAM INFORMATION
⑦ RECEIVE PROGRAM, ALLOCATE RESOURCES ACCORDING TO PROGRAM INFORMATION, EXECUTE PROGRAM

FIG. 21

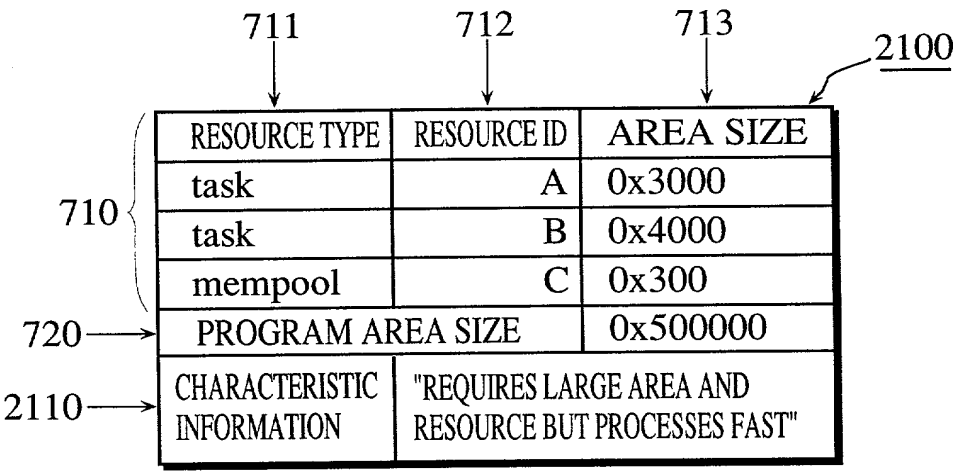
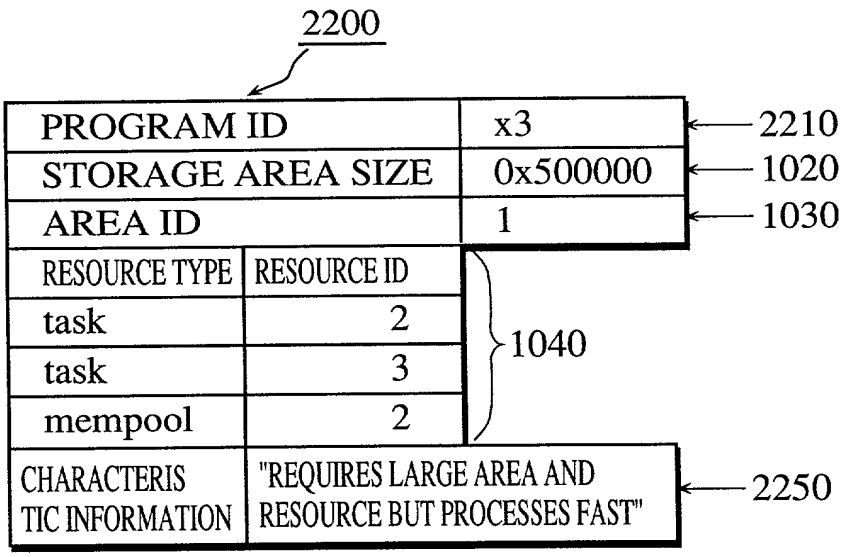

711
712
713
2100
RESOURCE TYPE
RESOURCE ID
AREA SIZE
task
A
0x3000
task
B
0x4000
mempool
C
0x300
710
PROGRAM AREA SIZE
0x500000
720
CHARACTERISTIC INFORMATION
"REQUIRES LARGE AREA AND RESOURCE BUT PROCESSES FAST"
2110

FIG. 22


2200
PROGRAM ID
x3
2210
STORAGE AREA SIZE
0x500000
1020
AREA ID
1
1030
RESOURCE TYPE
RESOURCE ID
task
2
task
3
mempool
2
1040
CHARACTERIS TIC INFORMATION
"REQUIRES LARGE AREA AND RESOURCE BUT PROCESSES FAST"
2250

EP 1 010 080 B1 9220260

FIG. 23

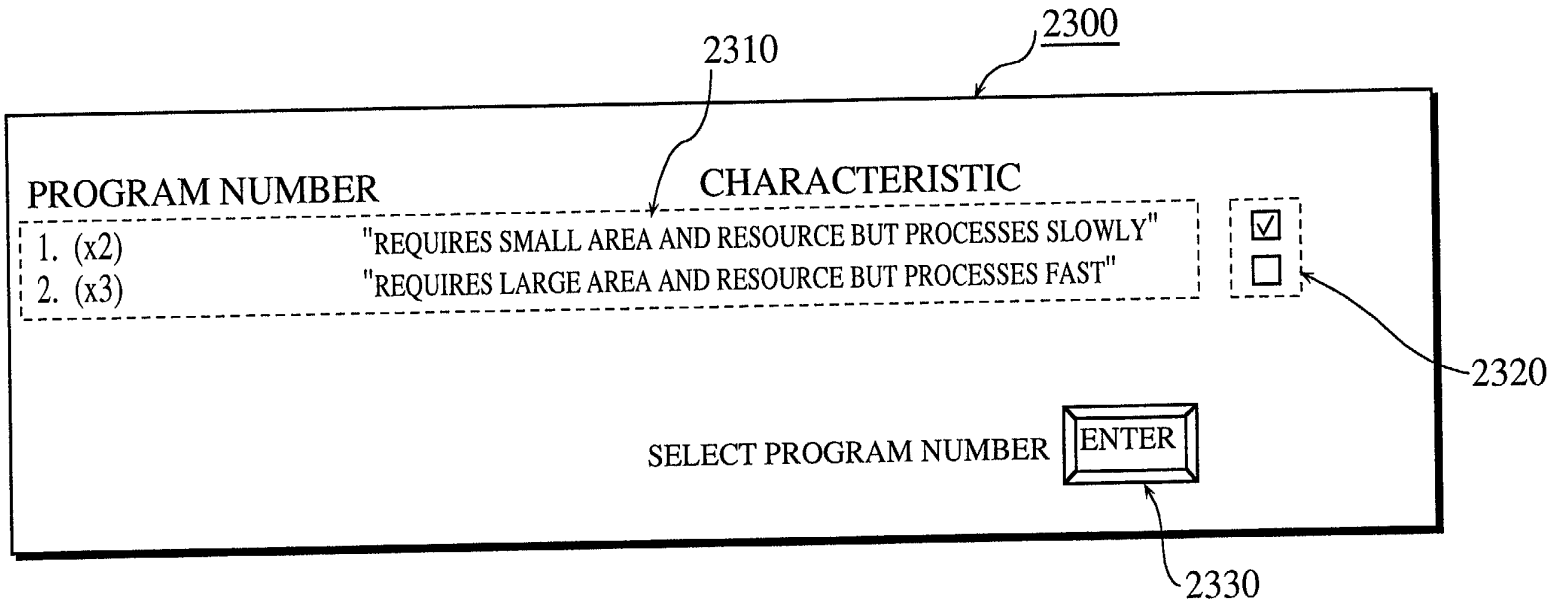


FIG.24

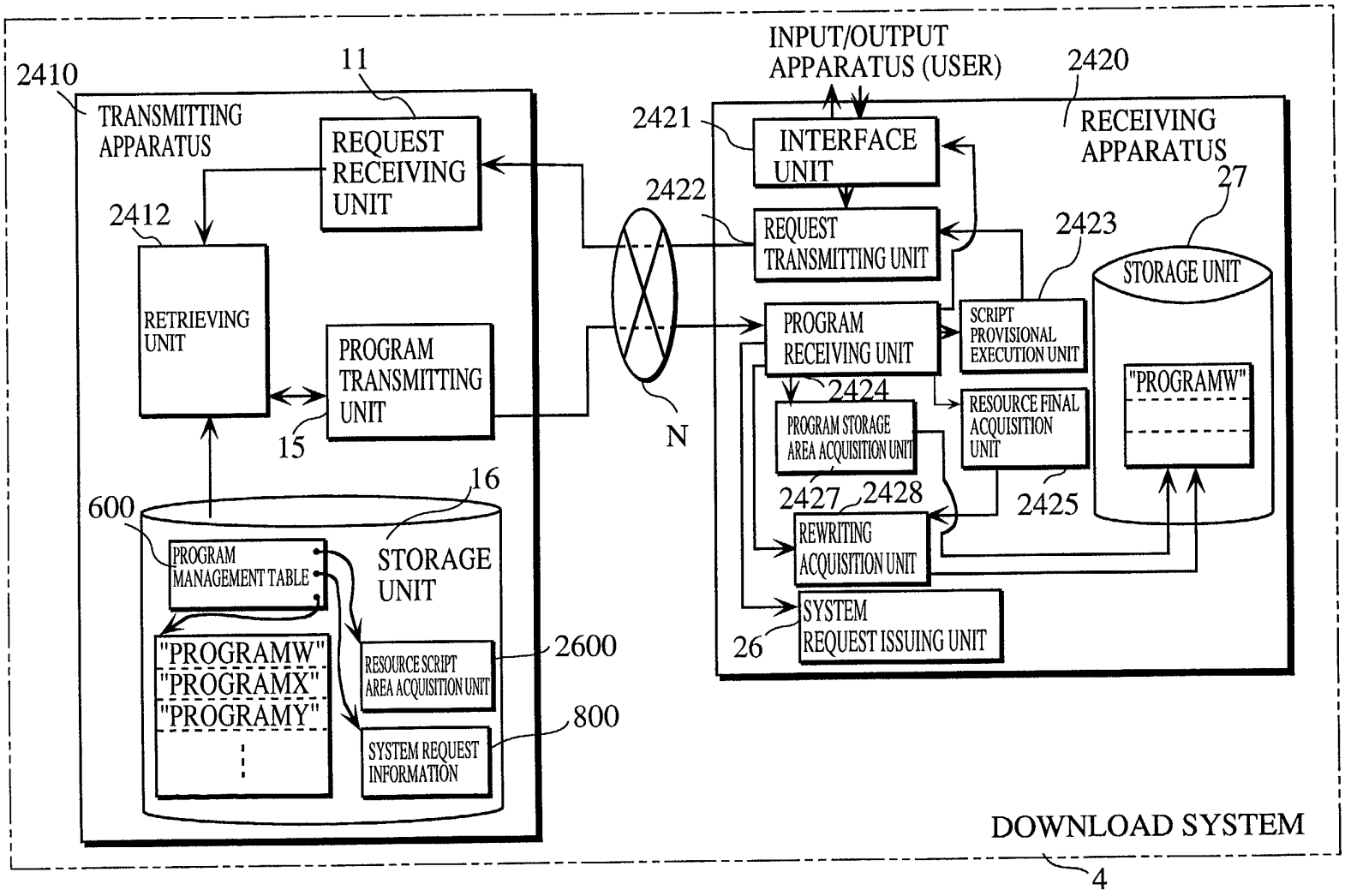

2410
TRANSMITTING APPARATUS
11
REQUEST RECEIVING UNIT
2412
RETRIEVING UNIT
PROGRAM TRANSMITTING UNIT
15
16
600
PROGRAM MANAGEMENT TABLE
STORAGE UNIT
"PROGRAMW"
"PROGRAMX"
"PROGRAMY"
RESOURCE SCRIPT AREA ACQUISITION UNIT
2600
SYSTEM REQUEST INFORMATION
800
N
INPUT/OUTPUT APPARATUS (USER)
2420
RECEIVING APPARATUS
2421
INTERFACE UNIT
2422
REQUEST TRANSMITTING UNIT
27
2423
STORAGE UNIT
PROGRAM RECEIVING UNIT
SCRIPT PROVISIONAL EXECUTION UNIT
"PROGRAMW"
2424
PROGRAM STORAGE AREA ACQUISITION UNIT
RESOURCE FINAL ACQUISITION UNIT
2427
2428
2425
REWRITING ACQUISITION UNIT
SYSTEM REQUEST ISSUING UNIT
26
DOWNLOAD SYSTEM
4

FIG. 25

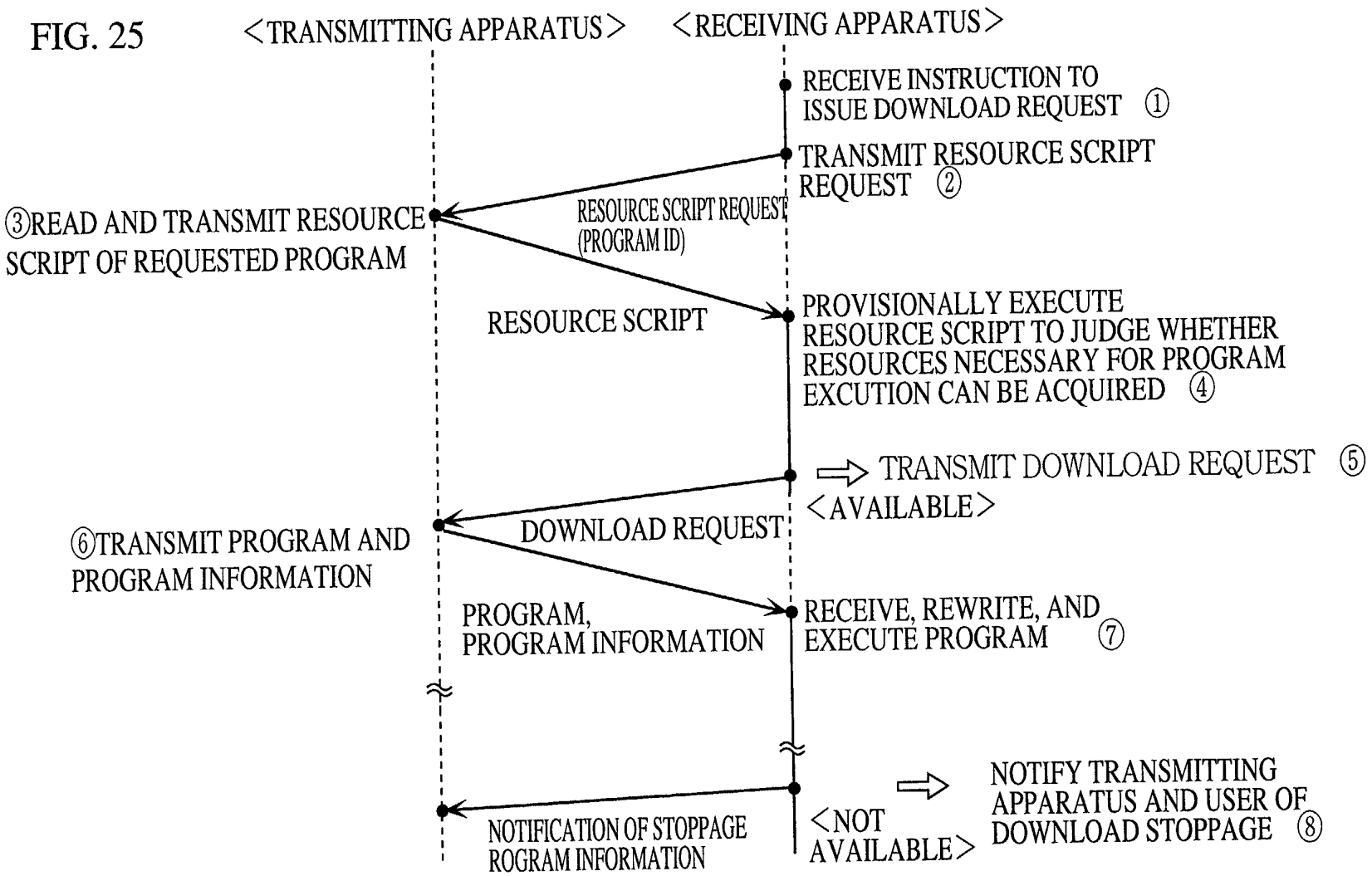

<TRANSMITTING APPARATUS>
<RECEIVING APPARATUS>
RECEIVE INSTRUCTION TO ISSUE DOWNLOAD REQUEST ①
TRANSMIT RESOURCE SCRIPT REQUEST ②
RESOURCE SCRIPT REQUEST (PROGRAM ID)
③READ AND TRANSMIT RESOURCE SCRIPT OF REQUESTED PROGRAM
RESOURCE SCRIPT
PROVISIONALLY EXECUTE RESOURCE SCRIPT TO JUDGE WHETHER RESOURCES NECESSARY FOR PROGRAM EXCUTION CAN BE ACQUIRED ④
⇨ TRANSMIT DOWNLOAD REQUEST ⑤
<AVAILABLE>
DOWNLOAD REQUEST
⑥TRANSMIT PROGRAM AND PROGRAM INFORMATION
PROGRAM, PROGRAM INFORMATION
RECEIVE, REWRITE, AND EXECUTE PROGRAM ⑦
NOTIFY TRANSMITTING APPARATUS AND USER OF DOWNLOAD STOPPAGE ⑧
<NOT AVAILABLE>
NOTIFICATION OF STOPPAGE ROGRAM INFORMATION

FIG.26

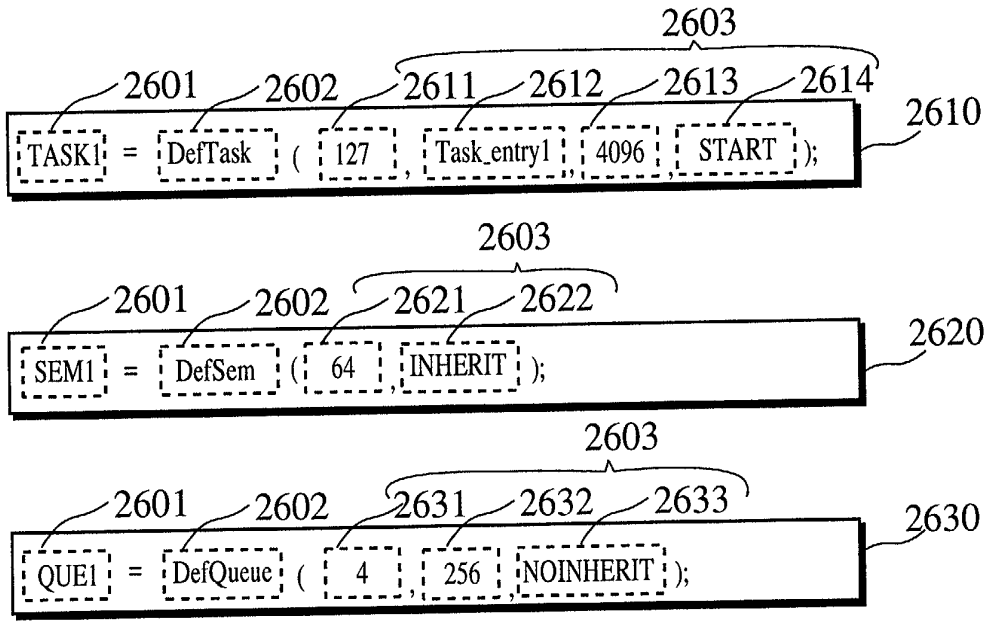

2603
2601
2602
2611
2612
2613
2614
TASK1 = DefTask (127 , Task_entry1 , 4096 , START);
2610
2603
2601
2602
2621
2622
SEM1 = DefSem (64 , INHERIT);
2620
2603
2601
2602
2631
2632
2633
QUE1 = DefQueue (4 , 256 , NOINHERIT);
2630

FIG. 27

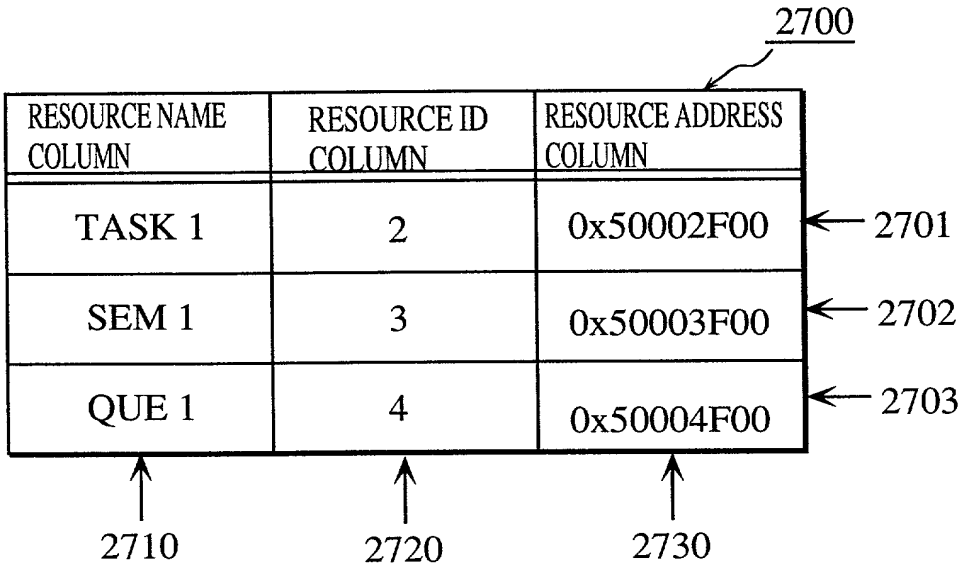

2700
RESOURCE NAME COLUMN
RESOURCE ID COLUMN
RESOURCE ADDRESS COLUMN
TASK 1
2
0x50002F00
2701
SEM 1
3
0x50003F00
2702
QUE 1
4
0x50004F00
2703
2710
2720
2730

FIG.28A

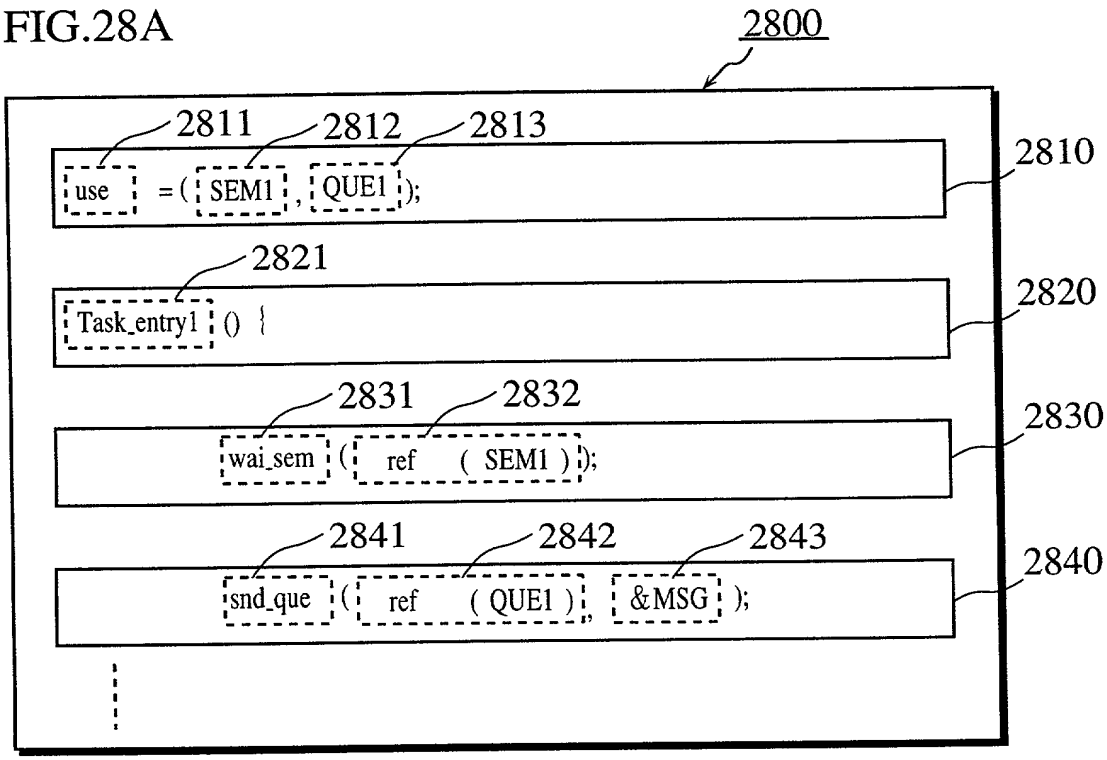


FIG.28B

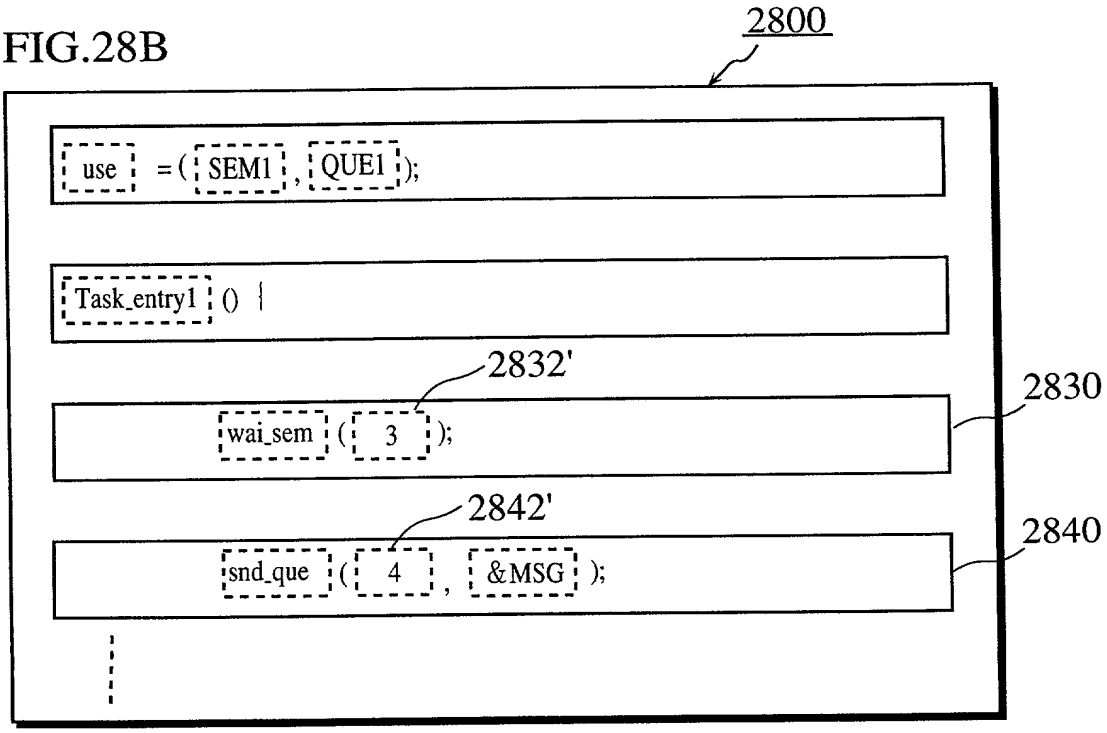


FIG. 29

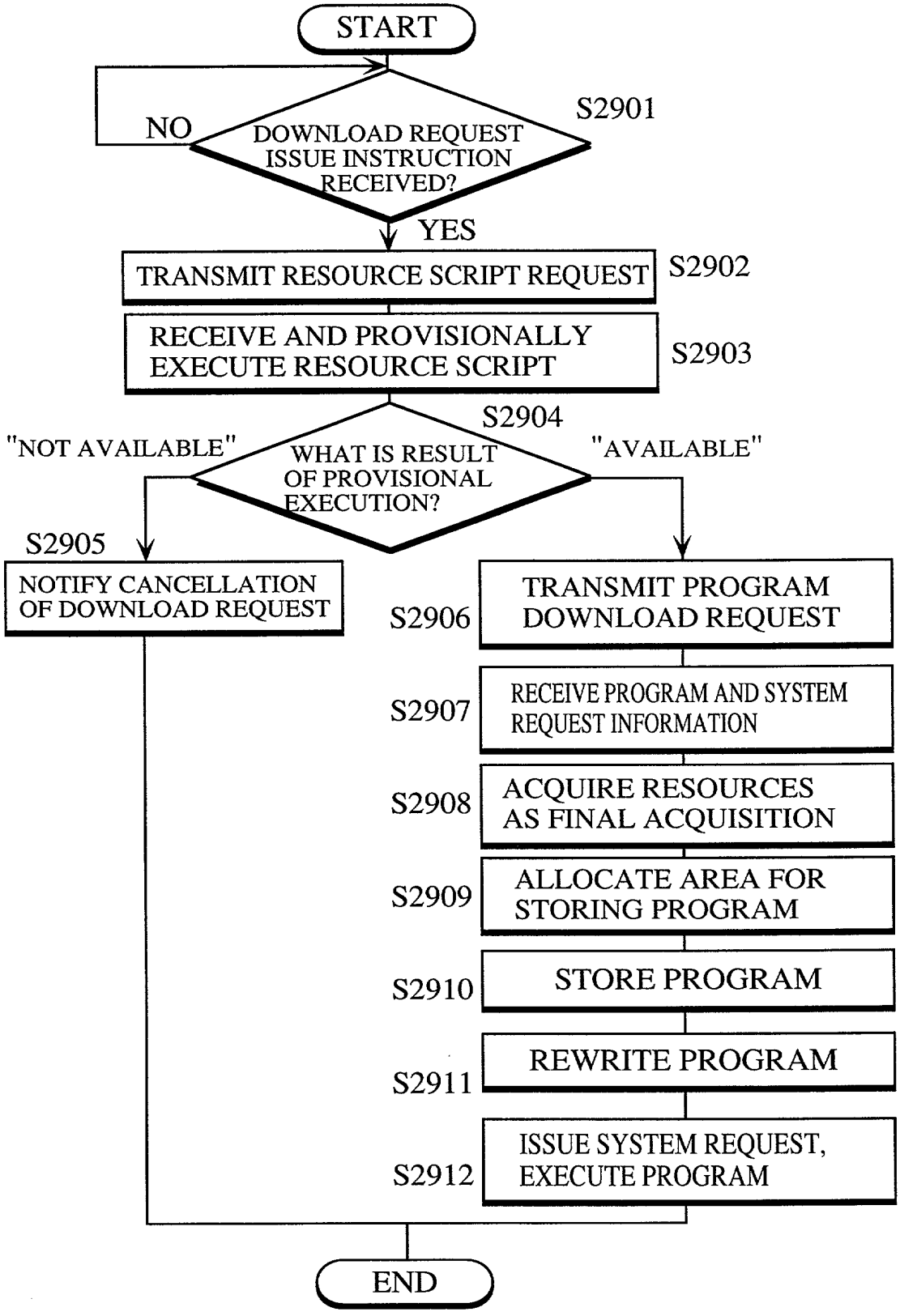

START
S2901
NO
DOWNLOAD REQUEST ISSUE INSTRUCTION RECEIVED?
YES
TRANSMIT RESOURCE SCRIPT REQUEST
S2902
RECEIVE AND PROVISIONALLY EXECUTE RESOURCE SCRIPT
S2903
S2904
"NOT AVAILABLE"
WHAT IS RESULT OF PROVISIONAL EXECUTION?
"AVAILABLE"
S2905
NOTIFY CANCELLATION OF DOWNLOAD REQUEST
S2906
TRANSMIT PROGRAM DOWNLOAD REQUEST
S2907
RECEIVE PROGRAM AND SYSTEM REQUEST INFORMATION
S2908
ACQUIRE RESOURCES AS FINAL ACQUISITION
S2909
ALLOCATE AREA FOR STORING PROGRAM
S2910
STORE PROGRAM
S2911
REWRITE PROGRAM
S2912
ISSUE SYSTEM REQUEST, EXECUTE PROGRAM
END

FIG.30

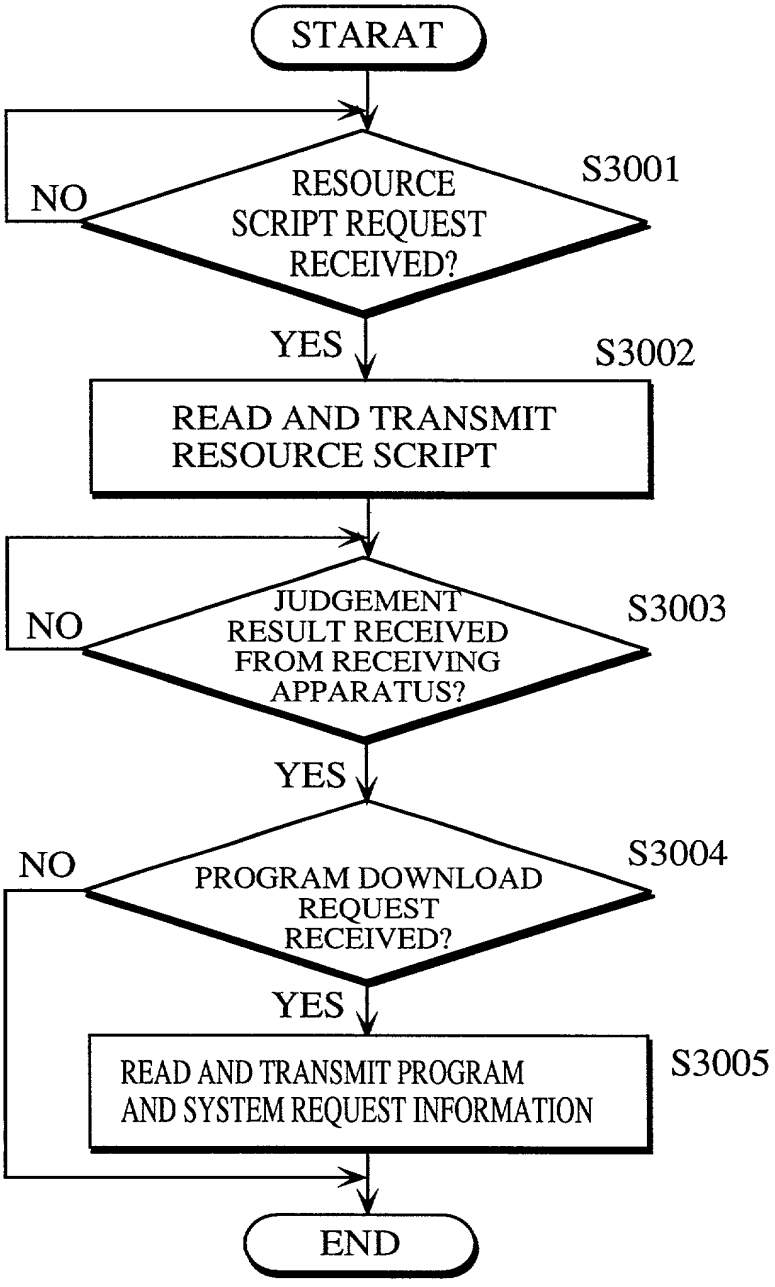

STARAT
RESOURCE SCRIPT REQUEST RECEIVED?
S3001
NO
YES
READ AND TRANSMIT RESOURCE SCRIPT
S3002
JUDGEMENT RESULT RECEIVED FROM RECEIVING APPARATUS?
S3003
NO
YES
PROGRAM DOWNLOAD REQUEST RECEIVED?
S3004
NO
YES
READ AND TRANSMIT PROGRAM AND SYSTEM REQUEST INFORMATION
S3005
END

FIG.31

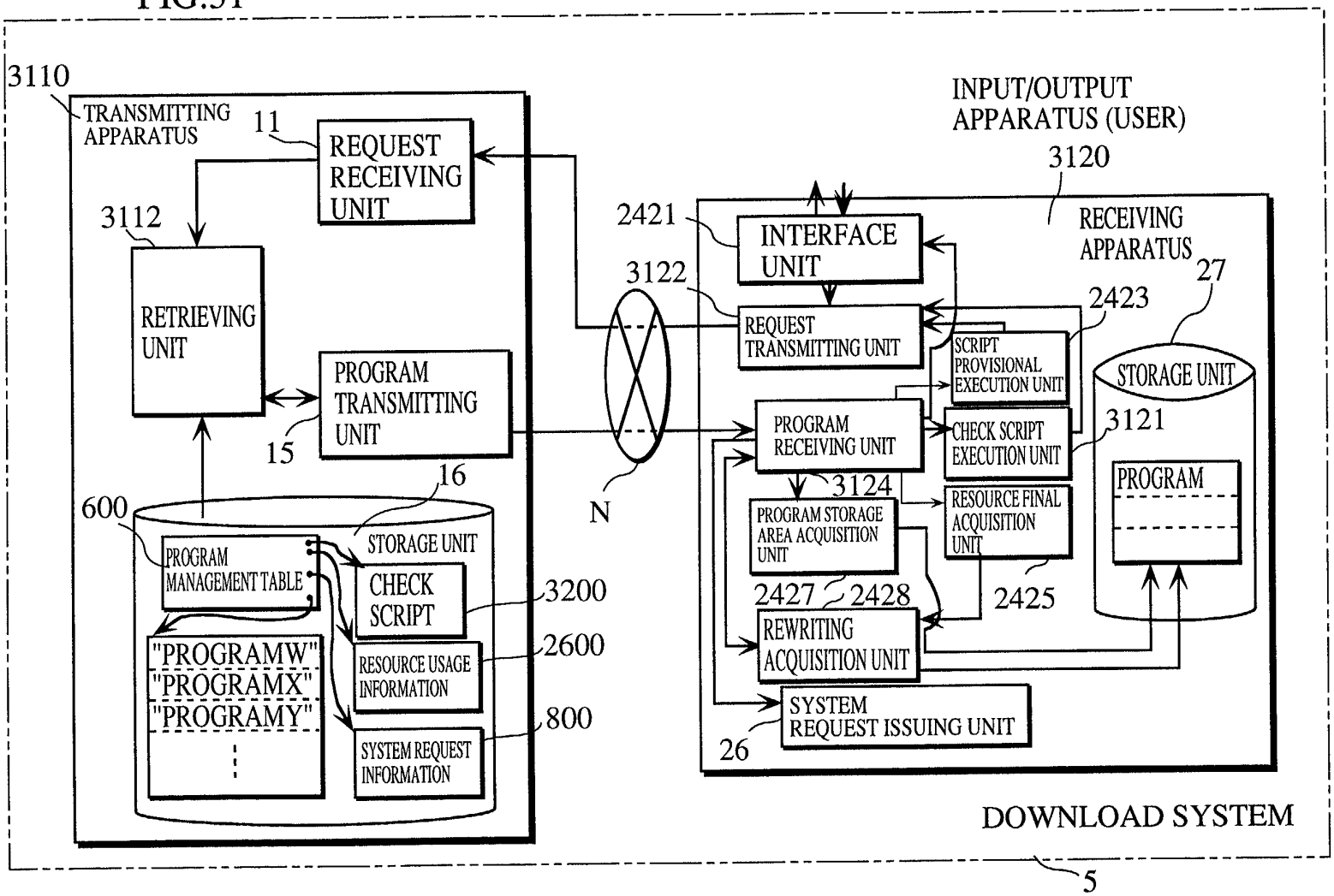

3110
TRANSMITTING APPARATUS
11
REQUEST RECEIVING UNIT
3112
RETRIEVING UNIT
PROGRAM TRANSMITTING UNIT
15
16
600
STORAGE UNIT
PROGRAM MANAGEMENT TABLE
CHECK SCRIPT
3200
"PROGRAMW"
"PROGRAMX"
"PROGRAMY"
RESOURCE USAGE INFORMATION
2600
SYSTEM REQUEST INFORMATION
800
N
3122
INPUT/OUTPUT APPARATUS (USER)
3120
RECEIVING APPARATUS
2421
INTERFACE UNIT
REQUEST TRANSMITTING UNIT
2423
SCRIPT PROVISIONAL EXECUTION UNIT
27
STORAGE UNIT
PROGRAM RECEIVING UNIT
CHECK SCRIPT EXECUTION UNIT
3121
PROGRAM
3124
PROGRAM STORAGE AREA ACQUISITION UNIT
RESOURCE FINAL ACQUISITION UNIT
2427
2428
2425
REWRITING ACQUISITION UNIT
SYSTEM REQUEST ISSUING UNIT
26
DOWNLOAD SYSTEM
5

FIG. 32A

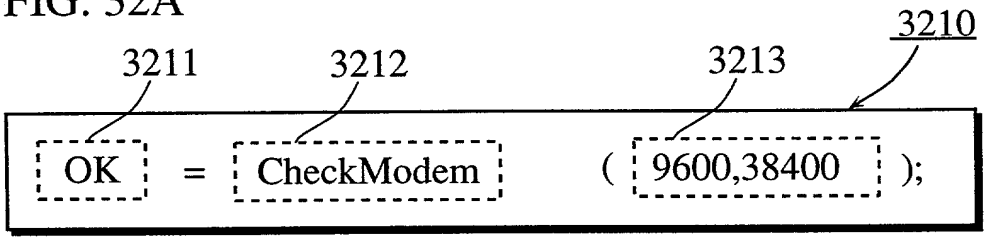


FIG. 32B

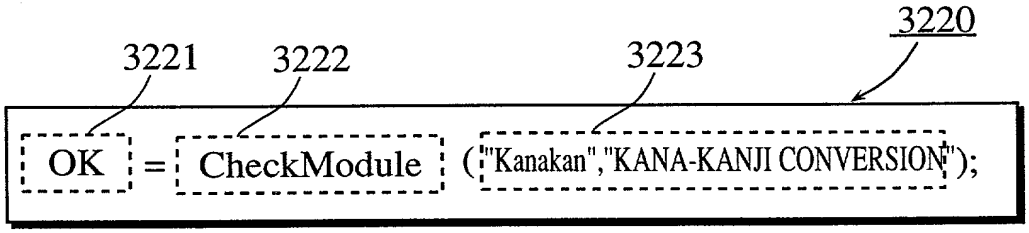
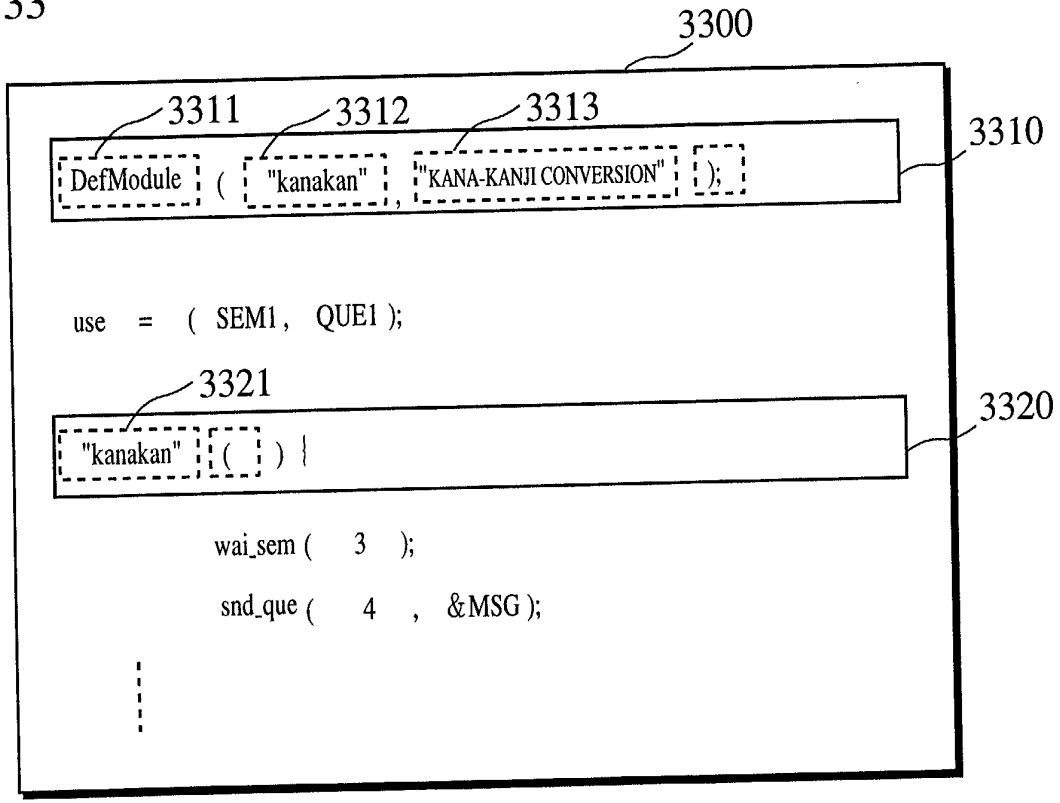


FIG.33


3300
3311
3312
3313
3310
DefModule ("kanakan" , "KANA-KANJI CONVERSION");
use = (SEM1 , QUE1);
3321
3320
"kanakan" ( ) {
wai_sem (3);
snd_que (4 , &MSG);